Chapter 2.20

RURAL PUBLIC STREET DESIGN STANDARDS

The Department of Public Works and Utilities is assigned responsibility for administration of these design standards.

Section 1. GENERAL

This standard shall apply to public streets located outside of the City but within the zoning jurisdiction of the City and in an area which will not be annexed upon subdivision approval.

The design of rural public streets generally conforms to the *Minimum Design Standards for Municipal Streets* of the State of Nebraska Board of Public Roads Classifications & Standards, *A Policy on Geometric Design of Highways and Streets* of the American Association of State Highway and Transportation Officials (AASHTO) and the *Drainage Criteria Manual* of the City of Lincoln, Nebraska. Details of street construction shall conform to the *City of Lincoln Standard Specifications for Municipal Construction* and the *Lincoln Standard Plans*.

Section 2. POLICIES

2.1 General

The street system is designed to promote the safe and efficient movement of vehicular and pedestrian traffic from point of origin to point of destination and to provide an infrastructure element which can be readily maintained.

2.2 Intersections with Major Streets

Where control of access permits, the intersections of collector streets with major streets shall be spaced approximately one half mile (0.8 km) apart, with the intersection location dependant upon maintaining the required sight distances. Intersections of local streets with major streets, where permitted, shall be approximately one quarter mile (0.4 km) apart, with the intersection location dependant upon maintaining the required sight distances.

2.3 Provisions for Future Extensions

In new developments, streets which are intended to be extended beyond the limits of the development shall be improved to those limits and shall be designed to provide for the proper handling of surface drainage, storm runoff and the future projection of the street into the adjacent property. The developer shall be responsible for obtaining and paying the costs for any easements required to permit grading or construction of approved temporary drainage measures beyond the limits of the development.

2.4 Reviewing Agencies

All plans for construction of public street improvements shall be reviewed and approved by the Department of Public Works and Utilities and the Lancaster County Engineer.

Section 3. DESIGN AND CONSTRUCTION

3.1 Design Speed

The following design speeds shall be applied for the design of public streets:

Street Classification	Minimum Design Speed
Local Streets	30 mph (50 km/h)
Collector Streets	40 mph (65 km/h)
Major Streets	Determined by Public Works and Utilities Department

3.2 Sight Distances

Unobstructed sight distances as set forth in *Figures SD-1, SD-2, SD-3* and *SD-4* of *APPENDIX A,* shall be provided at all street intersections and alley accesses for vehicular and pedestrian traffic safety. Fences, walls signs or other obstructions shall not be placed in the public street and shall not be placed in the sight triangles as set forth in *Figures SD-1, SD-2, SD-3 and SD-4* except that chain-link fences free from shrubbery and vines may be placed on private property within the sight triangles at uncontrolled or yield controlled intersections.

3.3 Horizontal Street Alignment

3.3.1. Intersections

a. Angle of Intersection

Streets shall intersect as near as possible at right angles. In no case shall the angle of intersection vary more than 10 degrees from that right angle.

b. Intersection Separation

Where the streets do not continue through the intersection (T-Type) a minimum separation of at least 120 feet (36.58 m), as measured between the centerlines, shall be maintained.

c. Intersections on Curvilinear Streets

Where a curvilinear street intersects another, a straight tangent section shall be required at the approach to the intersection. The length required for this tangent is dependent upon the radius of the approaching curve and the design speed. The

minimum length of this tangent, as measured from the right-of-way of the intersected street to the point of curvature shall provide the unobstructed sight distance for the design speed as set forth in *Figure RSD-1* which is included at the end of this section.

d. T-Type intersections on Horizontal Curves

T-Type intersections may be permitted along the outside of any horizontal curve provided the minimum sight distances are provided, based on the design speed of the intersected curved street, and that the minimum approach tangent length is provided in the case of a curvilinear approaching street.

T-Type intersections may be permitted along the inside of a horizontal curve provided that the centerline radius of the curve is 525 feet (160 m) or greater, and that the minimum sight distances, based on the design speed of the intersected curved street, and the minimum approach tangent length, in the case of a curvilinear approaching street, are provided.

3.3.2. Curvilinear Alignment

a. Horizontal Curves

All changes of horizontal alignment between intersections shall be connected by circular curves. The minimum centerline radius of all curves shall be dependent upon the design speed. The roadway shall be designed with either a reversal of the crown on the outside edge of the roadway or for a maximum rate of superelevation of 6.0%. The minimum runoff lengths for the roadway superelevation or crown reversal shall be as shown. The following table sets forth the minimum radii for the various design speeds:

Design Speed	**Minimum Radius** (No Superelevation)	**Minimum Radius** (6.0% Superelevation)	**Min. Runoff Length**
30 mph (50 km/h)	1150 ft. (350.5 m)	275 ft. (76.2 m)	110 ft. (33.5 m)
40 mph (65 km/h)	2290 ft. (698.0 m)	500 ft. (152.4 m)	130 ft. (39.6 m)
50 mph (80 km/h)	3820 ft. (1164.3 m)	820 ft. (249.9 m)	150 ft. (45.7 m)
55 mph (90 km/h)	4775 ft. (1544.4 m)	995 ft. (303.3 m)	175 ft. (53.3 m)

3.3.3. Cul-de-Sacs

Geometry and details of standard symmetrical and offset type cul-de-sacs for the various property line radii are shown on *Figures S-1, S-2 and S-3* of the standards for *Urban Public Street Design and Construction*.

3.4 Vertical Street Alignment

3.4.1. Longitudinal Grades

a. Minimum

The minimum longitudinal grade for all public streets shall be 0.5% to provide for adequate surface drainage.

b. Maximum

The maximum longitudinal grade shall be 8.0% for local streets and 7.0% for collector streets. The maximum longitudinal grade for major streets will be determined by the Public Works and Utilities Department. The drainage runoff carried by the roadside ditches must be determined and if the velocity of flow in the ditches from the required design storm exceeds 5 feet per second (1.52 mps), special treatment of the ditches shall be required to control erosion. Runoff determination and erosion control methods shall conform to the requirements of the *Drainage Criteria Manual* of the City of Lincoln.

3.4.2. Vertical Curves

Changes in longitudinal grades shall be designed using parabolic vertical curves. Where the algebraic difference between the two grades expressed in percent is 1.0 or less, no curve is required. The minimum length of vertical curves necessary to provide adequate safe stopping sight distance shall be determined using the following formula:

$$\mathbf{L = K\ A}$$

Where: L = Minimum length of curve as measured in a horizontal plane.
K = A measure of curvature, values of which are set forth in the following table.
A = The algebraic difference between the grades of the tangents to the curve expressed in percent.

Design Speed mph (km/h)	**K- Value** Crest Curves feet (meter)	**K-Value** Sag Curves feet (meter)
30 (50)	30 (9)	35 (11)
40 (65)	60 (18)	55 (17)
50 (80)	110 (32)	80 (25)
55 (90)	150 (43)	103 (30)

For vertical curves connecting flatter grades, care shall be taken to provide adequate slope for drainage. Generally, K < 165 (50 metric) for both sag and crest curves. The length of the vertical curve shall be kept as close as practicable to the minimum length as determined by the above procedure.

3.4.3. Intersection Approaches

a. Major Streets
The grade of any street approaching a major street shall not exceed 3.0% within 130 feet (39.6 m) of the closest edge of the intersected roadway.

b. Collector Streets
The grade of a local street approaching a collector street shall not exceed 3.0% within 70 feet (21.3 m) of the closest edge of the intersected roadway.

c. Local Streets
The approach grades of all intersecting local streets which continue through the intersection shall not exceed 3.0% within 70 feet (21.3 m) of the closest edge of the intersected roadway. At T-type intersections, the grades of the through street may exceed 3.0%.

d. Unimproved Major Streets
Where new developments abut major streets which are not yet improved to major street standards, approach grades, intersections and abutting property grading should be designed to conform to the future grades of the major street. The grades and alignment of the major street shall be approved by the Public Works and Utilities Department and the Lancaster County Engineer.

3.5 Roadway Cross-Section

3.5.1. Typical Cross-Section of Improvement
Rural public streets shall be improved with a paved or granular surfaced roadway to conform at least to the typical cross-section shown in *Figure RS-1*. An urban type section with a paved roadway and curbs, conforming to the requirements of the *Urban Public Streets Design and Construction Standards*, may be constructed at the option of the developer. All grading, embankment construction, compaction, subgrade preparation, and granular surfacing or paving construction shall conform to the requirements of the *City of Lincoln Standard Specifications for Municipal Construction*.

3.5.2. Granular Surfacing
Roadways shall have a minimum of 3 inches (75 mm) of crushed rock embedded in the subgrade, covered with a minimum of 1 inch (25 mm) of gravel.

3.5.3. Roadway Paving
If paved, roadways may be surfaced with either 6” (155 mm) portland cement concrete pavement or 6” (155 mm) asphaltic concrete pavement.

3.6 Intersection Geometry

At intersections, the edge of the roadway or curbs of intersecting streets shall be connected by circular curves having a radius of at least 30 feet (9 m).

At intersections with major streets and county roads, additional right or left turning lanes, medians, tapered roadway sections or other special features may be required to accommodate anticipated traffic. The Public Works and Utilities Department and the Lancaster County Engineer will provide the specific design requirements at these locations on an individual basis. A permit from the Lancaster County Engineer will be required for any construction in County right-of-way.

3.7 Lateral Obstacle Clearance

Minimum obstacle clearance for curbed sections shall be 2 feet (0.6 m) as measured from the back of curb to the face of the obstacle. Minimum obstacle clearance for non-curbed sections shall be 8 feet (2.4 m) as measured from the edge of the driving lane to the face of the obstacle. Traffic control devices conforming to the standards of the *Manual on Uniform Traffic Control Devices* will be allowed in the obstacle clearance zone.

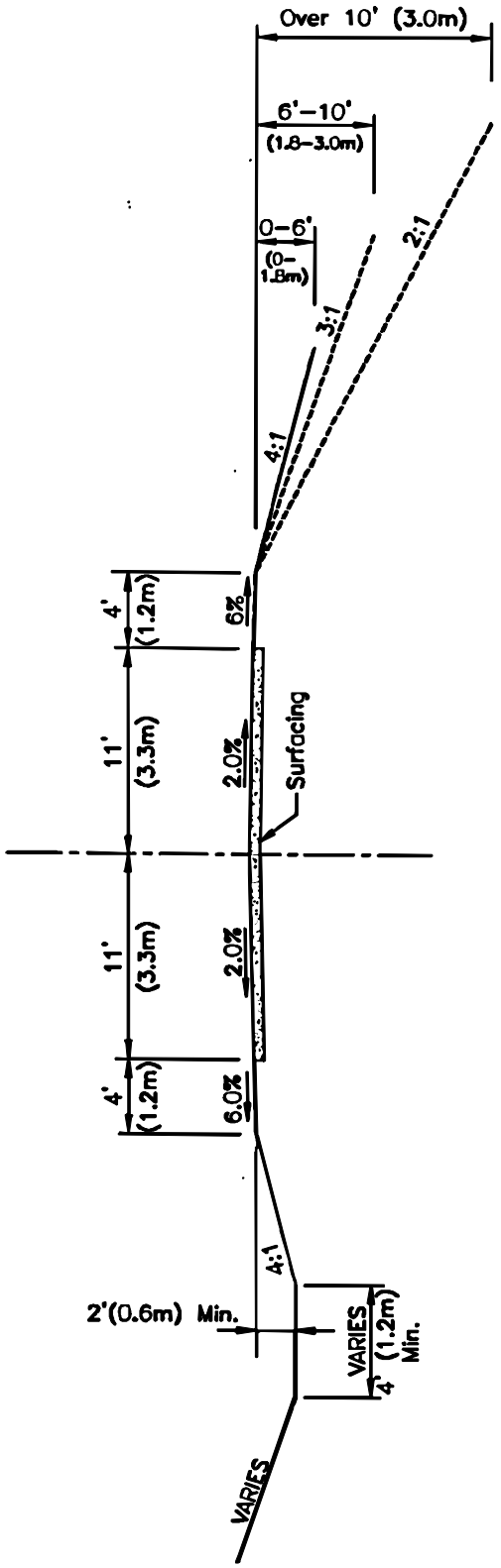
3.8 Temporary Turnarounds

Where required, temporary turnarounds shall be constructed in conformance with the details shown on the *Lincoln Standard Plans*. Direct access to the temporary turnaround from abutting properties will not be permitted.

3.9 Drainage Facilities

Storm sewers, open channels, culverts, inlets and other drainage facilities and appurtenances shall conform to the requirements of the *Drainage Criteria Manual* of the City of Lincoln, Nebraska.

The minimum size for driveway culverts shall be 18 inches (457 mm) diameter.



TYPICAL SECTION OF
RURAL STREET IMPROVEMENT

FIGURE RS-1